

Syllabus for General Entomology AG/BI 345 - Fall 2017

August 17, 2017

1 Place and Time

Labs and lectures will take place in ALS 124, which is the teaching lab in the Agriculture and Life Sciences Building.

- Lectures: Tuesdays and Thursdays, 11:00-12:20
- Labs: Mondays 12:30-3:20

2 Instructor and Contact Information

Dr. Aubrey Moore

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3 Course Description (from the UoG Catalog)

This course is an overview of insect biology with emphasis on fundamental problems encountered by insects, and the structural and functional adaptations used to overcome these problems. The laboratory focuses on insect identification. An insect collection is required. The course meets for three hours of lecture weekly. Prerequisites: BI157-157L or AG109 or AG281.

4 Required Text Book

Borror, D. J. and R. E. White 1970. **A Field Guide to Insects**. Houghton Mifflin ISBN 0-395-91170-2.

5 Curricular Mapping

5.1 Institutional Learning Objectives (from the UoG Catalog)

Some of the expected fundamental knowledge, skills, and values that the University of Guam student will have demonstrated upon completion of any degree are:

1. Mastery of critical thinking and problem solving
2. Mastery of quantitative analysis
3. Effective oral and written communication
4. Understanding and appreciation of culturally diverse people, ideas, and values in a democratic context
5. Responsible use of knowledge, natural resources, and technology
6. An appreciation of the arts and sciences
7. An interest in personal development and lifelong learning

5.2 Program Learning Objectives (from the UoG Catalog)

5.2.1 Learning Objectives for Agriculture Students

Disciplinary Knowledge: Graduates apply their agricultural knowledge and skills in the production of agricultural products using best management practices and addressing locally important issues such as island pocket economies, conservation, invasive species and endangered species problems. They use their knowledge and understanding of scientific concepts to diagnose and solve problems in agricultural fields.

1. Quantitative Skills: Graduates apply numerical methods in research design, financial analysis, pesticide and fertilizer application, irrigation and field setup and use computers for analysis of data and preparation of reports of results.
2. Research/laboratory skills: Graduates are competent in basic laboratory procedures and safety in the laboratory and the field. Students will develop applied thinking skills to help them formulate testable hypotheses and create effective experimental designs.

3. **Communication Skills:** Graduates can gather and assess evidence and use it to create effective lab and scientific reports, and oral presentations. They will develop the ability to identify, summarize and effectively communicate current issues to given audiences.
4. **Technological Literacy:** Graduates are competent at applying technological skills to their chosen work. They are also competent in the use of analog and digital equipment used in modern agricultural systems. Graduates effectively judge the usefulness and appropriateness of existing and new technologies in their professional endeavors.
5. **Professionalism:** Graduates work effectively together in teams in laboratory, community and field settings while following ethical principles in analysis and communication. Graduates apply their gained knowledge in addressing natural resource and social issues.

5.2.2 Learning Objectives for Biology Students

Disciplinary knowledge and skills: Graduates use their knowledge and understanding of essential concepts to solve problems in ecology, genetics, molecular biology, systematics, and evolution. They can apply their biology knowledge and skills to locally important issues such as island biogeography, conservation, and endangered species problems. They apply relevant concepts from chemistry and physics to biology problems.

1. **Quantitative skills:** Graduates apply numerical methods in research design, and use computers for analysis manipulating and modeling biological data.
2. **Research/laboratory skills:** Graduates are competent in basic biology procedures and safety in the laboratory and the field; they formulate testable hypotheses and create effective experimental designs using their knowledge, understanding, and practical experience of scientific instruments.
3. **Communication skills:** Graduates use scientific literature and diagrams as a source of information, properly cite sources and avoid plagiarism, and create text and graphics to communicate results effectively through print and oral presentations. They collect and assess evidence and use it to create effective arguments in writing scientific reports and proposals.
4. **Digital Literacy:** Graduates use and process information in multiple formats via computer. Graduates are competent in the following computer skills as related to their science work: desktop competencies, word processing, presentation, and data retrieval and manipulation. Graduates effectively judge the usefulness and accuracy of external sources of information.
5. **Professionalism:** Graduates work effectively together in teams in a laboratory and field settings and follow ethical principles underlying scientific research and pub-

lication. Graduates understand and apply the values and limitations of scientific research in addressing public policy issues.

5.3 Student Learning Outcomes for AG/BI 345

Upon completion of AG/BI 345, General Entomology:

1. Students will be able to accurately identify any insect on Guam to the taxonomic level of Order and in most cases to Family.
2. Students will be familiar with the behavior and biology of common insects on Guam.
3. Students will know how to collect insects and preserve them as museum quality specimens with proper labeling.
4. Students will have an understanding of the importance of insects in ecosystem function.
5. Students will be aware of negative impacts of invasive species on Guam's ecosystems and economy and will be certified as First Detectors by the National Plant Diagnostics Network.
6. Students will know how to find detailed information on insects in online resources and in the scientific literature.

6 Schedule

Subject	Start Date	Start Time	End date	End Time	All Day Event
Lecture 1: Introduction to Entomology	08/17/2017	11:00	08/17/2017	12:20:00 PM	FALSE
Lab 1: Intro to insect collecting – tools of the trade	08/21/2017	12:30	08/21/2017	03:20:00 PM	FALSE
Lecture 2: Insect Biodiversity and Taxonomy	08/22/2017	11:00	08/22/2017	12:20:00 PM	FALSE
Lecture 3: Insect Biodiversity in Micronesia	08/24/2017	11:00	08/24/2017	12:20:00 PM	FALSE

Subject	Start Date	Start Time	End date	End Time	All Day Event
Lab 2: Special techniques; spreading moths and butterflies; pointing small insects	08/28/2017	12:30	08/28/2017	03:20:00 PM	FALSE
Lecture 4: Invasion of the Land	08/29/2017	11:00	08/29/2017	12:20:00 PM	FALSE
Lecture 5: External Insect Morphology	08/31/2017	11:00	08/31/2017	12:20:00 PM	FALSE
HOLIDAY: Labor Day	09/04/2017	00:00	09/05/2017	12:00:00 AM	TRUE
Lecture 6: Internal insect Morphology	09/05/2017	11:00	09/05/2017	12:20:00 PM	FALSE
Lecture 7: Metamorphosis	09/07/2017	11:00	09/07/2017	12:20:00 PM	FALSE
Lab 3: Insect Photography	09/11/2017	12:30	09/11/2017	03:20:00 PM	FALSE
Lecture 8: Insect Orders with Complete Metamorphosis	09/12/2017	11:00	09/12/2017	12:20:00 PM	FALSE
Lecture 9: Guest Lecture (Roland Quitugua): Coconut Rhinoceros Beetle	09/14/2017	11:00	09/14/2017	12:20:00 PM	FALSE
Lab 4: Independent work on collection	09/18/2017	12:30	09/18/2017	03:20:00 PM	FALSE
Lecture 10: Guest Lecture(Jesse Bamba): Insect Pests of Agriculture on Guam	09/19/2017	11:00	09/19/2017	12:20:00 PM	FALSE
Lecture 11: Insect Orders with Incomplete Metamorphosis I	09/21/2017	11:00	09/21/2017	12:20:00 PM	FALSE

Subject	Start Date	Start Time	End date	End Time	All Day Event
Lab 5: Independent work on collection	09/25/2017	12:30	09/25/2017	03:20:00 PM	FALSE
Lecture 12: Insect Orders with Incomplete Metamorphosis II; Review for Exam 1	09/26/2017	11:00	09/26/2017	12:20:00 PM	FALSE
Exam 1	09/28/2017	11:00	09/28/2017	12:20:00 PM	FALSE
Lab 6: Independent work on collection	10/02/2017	12:30	10/02/2017	03:20:00 PM	FALSE
Lecture 13. Insect Ecology – Population Dynamics	10/03/2017	11:00	10/03/2017	12:20:00 PM	FALSE
Lecture 14. Insect Ecology – Predator-prey relationships and biological control	10/05/2017	11:00	10/05/2017	12:20:00 PM	FALSE
Lab 7: Proposals for Research Projects	10/09/2017	12:30	10/09/2017	03:20:00 PM	FALSE
Lecture 15. Insect Ecology – Semiochemicals	10/10/2017	11:00	10/10/2017	12:20:00 PM	FALSE
Lecture 16. Insect Ecology – Social Insects	10/12/2017	11:00	10/12/2017	12:20:00 PM	FALSE
Lab 8: Field Trip to Yigo Ag. Expt. Stn.	10/16/2017	12:30	10/16/2017	03:20:00 PM	FALSE
Lecture 17. Insect Ecology – Pollination	10/17/2017	11:00	10/17/2017	12:20:00 PM	FALSE
Lecture 18. Insect Ecology – Mimicry	10/19/2017	11:00	10/19/2017	12:20:00 PM	FALSE
Lab 9: Independent work on collection	10/23/2017	12:30	10/23/2017	03:20:00 PM	FALSE

Subject	Start Date	Start Time	End date	End Time	All Day Event
Lecture 19: Insect Invasions on Guam I; Review for Exam 2	10/24/2017	11:00	10/24/2017	12:20:00 PM	FALSE
EXAM 2	10/26/2017	11:00	10/26/2017	12:20:00 PM	FALSE
Lab 10: Independent work on collection	10/30/2017	12:30	10/30/2017	03:20:00 PM	FALSE
HOLIDAY: All Soul's Day	10/31/2017	00:00	11/01/2017	12:00:00 AM	TRUE
Lecture 20: Insect Invasions on Guam II	11/02/2017	11:00	11/02/2017	12:20:00 PM	FALSE
Lab 11: Independent work on collection	11/06/2017	12:30	11/06/2017	03:20:00 PM	FALSE
Lecture 21: First Detector Training	11/07/2017	11:00	11/07/2017	12:20:00 PM	FALSE
Lecture 22: Economic Entomology and Pest Control	11/09/2017	11:00	11/09/2017	12:20:00 PM	FALSE
HOLIDAY: Veterans Day	11/10/2017	00:00	11/11/2017	12:00:00 AM	FALSE
Lab 12: Independent work on collection	11/13/2017	12:30	11/13/2017	03:20:00 PM	FALSE
Lecture 23: Urban Entomology	11/14/2017	11:00	11/14/2017	12:20:00 PM	FALSE
Lecture 24: Medical Entomology	11/16/2017	11:00	11/16/2017	12:20:00 PM	FALSE
Lab 13: Research Project Presentations	11/20/2017	12:30	11/20/2017	03:20:00 PM	FALSE
Lecture 25: Forensic Entomology	11/21/2017	11:00	11/21/2017	12:20:00 PM	FALSE
HOLIDAY: Thanksgiving	11/23/2017	00:00	11/25/2017	12:00:00 AM	TRUE
Lab 14: Independent work on collection	11/27/2017	12:30	11/27/2017	03:20:00 PM	FALSE

Subject	Start Date	Start Time	End date	End Time	All Day Event
Lecture 26: Insects as a Human Food Source	11/28/2017	11:00	11/28/2017	12:20:00 PM	FALSE
Lecture 27: Silk	11/30/2017	11:00	11/30/2017	12:20:00 PM	FALSE
Lab 15: Turn in Collections for Grading	12/04/2017	12:30	12/04/2017	03:20:00 PM	FALSE
Lecture 28: TBD	12/05/2017	11:00	12/05/2017	12:20:00 PM	FALSE
Lecture 29: TBD; Review for Exam 3	12/07/2017	11:00	12/07/2017	12:20:00 PM	FALSE

7 Grading

Activity	Date/Deadline	Maximum Points
Exam 1	September 28	15
Exam 2	October 26	15
Exam 3	TBD	15
Research Project - written report	November 20	10
Research Project - oral presentation	November 20	5
First Detector Training	December 4	5
Insect Collection	December 4	35
Total		100

8 Course Guidelines

8.1 Course Web Site

- All handouts and other course resources will be available on the Ag/BI 345 web site at <https://aubreymoore.github.io/AGBI-345-F17/>.

8.2 Examinations

- Examinations are cumulative, meaning that you may be asked questions on any topics covered between the start of the course and the date of the exam.
- All exams are 'open book' and you are free to use digital devices and online resources.
- Part of each exam will be spent identifying insect specimens.

8.3 Research Project

- Research projects will be done by teams of 1, 2 or 3 people.
- Each team will make an oral presentation to propose their project during the October 10 lab period.
- Each team will submit a written research report and make an oral presentation during the November 20 lab period.

8.4 First Detector Training

During this course you will learn about impacts of invasive species on Guam and other islands. You will be trained and certified as 'First Detector' via a lecture and completion of online training modules provided by the National Plant Diagnostics Network at <https://firstdetector.org/static/index.html>.

8.5 Insect Collection

- You will be required to collect, preserve at least 35 insect species, with species from at least ten orders.
- We will not collect immature insects and soft bodied specimens which must be preserved in alcohol.
- We will use an iNaturalist project at <http://www.inaturalist.org/projects/ag-bi-345-f17> to record data for each specimen in the collection. I will provide software to print a catalog and pin labels.
- Collect adults only; spread Lepidoptera wings and mount minute insects on paper points
- You will receive a maximum of 35 points for your collection. You will get one point for each specimen which:
 - is properly preserved (moths and butterflies spread; insects too small to pin on paper points)
 - has an observation record in iNaturalist
 - points will not be given for specimens which do not comply to the above items
 - points will not be given for duplicate specimens with the same species